DOCUMENT RESUME

ED 283 999 CE 047 704

AUTHOR Kennedy, Kerry J.; And Others
TITLE Factors Affecting the Implementation of Innovation in Vocational Education: An Australian Perspective.
PUB DATE Apr 87
NOTE 41p.; Paper presented at the Annual Meeting of the American Educational Research Association (Washington, DC, April 19-24, 1987).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Apprenticeships; *Curriculum Development; *Educational Innovation; Educational Research; Electricity; Foreign Countries; Job Training; Plumbing; Postsecondary Education; *Research Utilization; *Theory Practice Relationship; *Vocational Education
IDENTIFIERS *Australia (Western Australia)

ABSTRACT

To assess the extent to which the results of implementation studies relating to elementary and secondary schools were generalizable to vocational education contexts, a study of two specific curriculum innovations in vocational education was undertaken in Western Australia. It was designed to yield information about the context of curriculum implementation in vocational education, to identify implementation strategies currently being used, and to make an assessment of their effectiveness. Case study methods were used to allow for the indepth analysis of the two curriculum implementation attempts: a modular system of apprenticeship training in the electrical trades and a pre-apprenticeship training course in plumbing. These methods were supplemented by use of a standardized questionnaire. The study found that for lecturers in the electrical area, concerns focused predominantly on the demands of the innovation on individuals and on changing the innovation, whereas for lecturers in the plumbing area, concerns were focused on increasing the impact of the innovation on students and finding effective ways to work as a group. It was clear that the plumbing pre-apprenticeship course was much more clearly defined than the electrical apprenticeship course. The study concluded that successful implementation characterized by concern for the impact of the innovation on students is related to the following factors: (1) explicitness of the innovation in the mind of the users; (2) the provisions of feedback mechanisms for all participants; and (3) active user participation in decision making. Attention to these factors could aid in vocational education curriculum implementation efforts. (KC)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED283999

Factors Affecting the Implementation of Innovation in Vocational Education: An Australian Perspective

Kerry J Kennedy
Curriculum Development Centre, Canberra

John Williamson
Curtin University of Technology

Catherine Patterson
Macquarie University

A paper prepared for presentation at the Annual Meeting of the American Educational Research Association, Washington DC, 20-24 April 1987.

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☒ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

K Kennedy

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

CE047704

BEST COPY AVAILABLE

INTRODUCTION

There has been considerable interest during the past decade in the processes associated with curriculum implementation in the elementary and secondary school (Fullan and Pomfret, 1977; Hall and Loucks, 1977; Berman and McLaughlin, 1978; Farrar, De Sanctis and Cohen, 1980; Fullan, 1981; Loucks and Lieberman, 1983) yet little attention has been paid to the area of vocational education. A recent review of the literature (Kennedy, Williamson and Patterson, 1984) identified only one article dealing specifically with that area of education (Scott, 1980). Yet the issues raised in the literature relating to elementary and secondary schools - high degrees of teacher resistance to externally imposed change, lack of support and resources to facilitate the implementation of innovation, the adaptation of change efforts so that they more readily suit local needs and the actual non-implementation of some change efforts - have serious implications if they are also applicable to vocational education.

To assess the extent to which the results of implementation studies relating to elementary and secondary schools were generalisable to vocational education contexts, a study of two specific curriculum innovations in vocational education was undertaken in Western Australia. It was not expected that the study would yield generalisable results. Rather, it was designed to yield information about the context of curriculum implementation in vocational education, to identify implementation strategies currently being used and to make an assessment of their effectiveness.

THE LITERATURE

There has been a considerable emphasis on studying the processes associated with the installation of educational innovation over the past two decades. A recent review of the literature by Hurst (1983) indicated that there has been a general interest in innovation processes at least since the nineteenth century. Yet educators are still unable to provide clear prescriptions for successful implementation and at times there has been confusion about the very nature of implementation itself. Indeed it has only been in the past decade that implementation has emerged as a discrete area of study. That it has done so is an indication of the crucial role it has to play in understanding the innovation process.

There was little talk of implementation in the 1960's. The curriculum reform movement of that time assumed that quality efforts in the design and dissemination of new educational products would guarantee that they would be used in school settings. Yet studies such as those of Fullan and Pomfret (1977) indicated that in many instances the use rates of such products had been radically overestimated. It seemed clear that the creation of good educational materials was a sufficient but not a necessary condition to ensure their use.

The implication of this finding for vocational education is important to note. Maling (1980) has indicated that there is considerable reliance on rational and systemic approaches to curriculum development in vocational education with particular reference to educational technologists such as Briggs (1970) and systems theorists such as Dick and Carey (1978). Thus vocational education in Australia has chosen to rely on the efficacy of curriculum design systems to create usable products. As in the areas of elementary and secondary education, there has been little attention paid to the fate of those products once they are diffused into the user system.

It would be wrong to assert, however, that diffusion or dissemination processes have been ignored entirely. Communications theorists such as Rogers (1962), relying on an older tradition with its roots in rural sociology, have exerted an enormous influence on educators. Havelock (1971) has given this approach its greatest sophistication for educators by highlighting the need for communication between the two key agents in the innovation process: the designer and the potential user. Such communication moves beyond simply verbal communication to encompass an understanding of each other's needs, priorities and concerns.

Hurst (1983) has pointed to the deficiencies in relying on communication alone:

> *One may communicate information about innovations in an exemplary manner, such that the target population is both fully informed and believes what it is told and still achieves a poor degree of implementation. This is because there are other reasons why a target population may be prevented from adopting the innovation concerned, or indeed may deliberately choose to reject it. Communications models are somewhat behaviouristic in effect, since they downplay the importance of the reasoning and discriminatory capacities if target populations. (p.46.)*

These views would also seem to be supported by empirical evidence (Fullan and Pomfret, 1977). Dissemination strategies may be able to convey information but this alone is not enough to bring about behavioural changes on the part of teachers. Such a view would also be supported with evidence from other human services areas where education campaigns designed to alter behaviour are rarely successful.

One important outcome of highlighting the role of dissemination strategies in the innovation process is that the adoption rate of innovations has often been taken as an indication of the success of an innovation. Rogers and Shoemaker (1971), for example, have reported on studies that characterise adopters of innovations as either 'early' adopters or 'late' adopters which suggests that while the rate of adoption might be variable it is almost inevitable. Yet in an important sense adoption rates tell us little about whether an innovation is actually used. The most they tell is that a decision has been made to use but such a decision cannot be taken to mean that the innovation has been put into practice.

It was just this distinction that led Fullan and Pomfret (1977) to highlight the importance of implementation which they defined as:

> *...the actual use of an innovation or what an innovation looks like in practice. This differs from both intended and planned use, and from the decision to use, the latter being defined as 'adoption'.*

Thus adoption is one step in the innovation process but it is not the final step. Unless it can be shown that the innovation has been implemented, i.e. used in practice, few claims can be made about the innovation's success.

A similar point has been highlighted by curriculum evaluators (Charters and Jones, 1973; Evans and Sheffler, 1976). As Kritek (1976) pointed out:

> *Evaluators (came) to realise that programs (could) not be faulted for failing to achieve intended outcomes if, in fact, they (had) not been successfully implemented. (p.87.)*

By the late 1970's such a view was commonly held (Hall and Loucks, 1977; Leithwood and Montgomery, 1980). Observations of teachers at work demonstrated clearly that more often than not only parts of innovations were used or in some cases the use of an innovation was so distorted that it did not resemble what was originally intended. In either case, unless the implementation characteristics of an innovation are known, any evaluation is meaningless.

If implementation is seen as a stage that lies between the adoption of an innovation and any evaluation of its effectiveness, the issue of concern is what happens to an innovation during its implementation. This issue was the focus of a large scale investigation carried out by the Rand Corporation. As part of that study, Berman and McLaughlin (1978) pointed out that Federal change agent policies had stimulated the adoption of innovations but that evaluation of those policies seemed to indicate that they had made little impact. Following intensive on-site study of a range of innovations, Berman and McLaughlin (1978) concluded that innovations underwent considerable change during implementation so as to meet the needs of local users. They referred to this process as 'mutual adaptation' where the objectives of the innovation were modified before it was able to be used in a local setting. This did not mean that the innovation failed to exert any impact, but rather than any impact was modified by the changes that were made.

The concept of mutual adaptation has had a considerable impact on thinking about the innovation process. Several writers have suggested that implementation must be viewed as a process that necessarily will change policy intentions or the intentions of an innovation's designers. Farrar, De Sanctis and Cohen (1980) describe implementation as a complex multilateral process in which negotiation and revision are essential. Rice and Rogers (1980) have argued the importance of providing for reinvention of any innovation so that the adopter can become involved in the change process. Larson and Agarwala-Rogers (1977) have argued that reinvention was also part of the implementation process in other human services areas apart from education. McLaughlin (1983) concluded after being involved in a wide range of empirical studies that implementation was a 'multi-level, multi-informant' process that was crucial to an understanding of any innovation or new policy effort.

While this view of implementation has been widespread, it has not been without its critics. Datta (1980) questioned the validity of The Rand Change Agent Study and argued that local level development would always be only one strategy for securing educational change. Crandall (1983) in a large scale empirical investigation found that there was a great deal of stability and durability related to selected innovations that he studied. He pointed out that:

> *Teachers change - given the opportunity to try out new practices which are perceived as attractive and constituting an improvement introduced by individuals judged worthy of emulation, and supported by formally designated leaders who are respected.*

Thus under certain conditions, 'in tact' changes can be delivered into classrooms. The support roles of specific individuals such as the principal, change facilitators and external consultants seem to be crucial for ensuring success.

Loucks (1983) conducted a cross-study analysis of four implementation studies in an attempt to discover whether innovation implementation was characterised by mutual adaptation or the fidelity of teachers to the objectives of the innovations. Apart from reporting that the studies defined innovations in different ways, that data sources varied from study to study and that fidelity was defined at different levels of education systems (sometimes at the school level and sometimes at the district level) she also reported that the survey components of the study found moderate degrees of fidelity whereas the field study components found high degrees of adaptation. Her explanation was that since each of the studies was conducted over a five year period, they probably reflect the growth of understanding in both how to improve schools and how to study such improvements. In this sense the results were not inconsistent but rather represented the product of growth in understanding of the processes involved.

There is clearly a tension between attempting to deliver innovations into schools in their pure form and expecting changes to be made as part of the process of implementation. This tension has also been reflected in the methodologies that have been used in studying the implementation process. Heck and Goldstein (1980) distinguished between 'structured' and 'unstructured' approaches to the study of implementation. The former stressed the fidelity between the designers' intentions and the implementation of the innovation. It tends to emphasise quantitative methodology to provide specific information that will assist in ensuring that the innovation is used in the way it was intended. There is an underlying belief in the desirability of the change and in devising strategies to ensure that it is implemented as planned. Examples are the Concerns Based Adoption Model (Hall and Loucks, 1977) and the work of Leithwood and Montgomery (1980).

The 'unstructured' approach on the other hand, emphasises understanding the implementation process by studying the interaction of the innovation with its educational context. Implementation is viewed as a complex process with unlimited variation. The specific methods used tend to be qualitative and the aim is to portray the reality of the implementation context. Such an approach is favoured by researchers who believe it is very often undesirable to predetermine implementation. Their purpose is to provide explanations about the complexities of implementation thus promoting greater understanding of the innovation process. An example is the Rand Change Agent Study (Berman and McLaughlin, 1978).

In general, then, the innovation process is seen to be complex with the emphasis on a series of well defined stages. The implementation stage is the crucial point at which the innovation is actually used. A range of studies has indicated conflicting results about the use of innovations. At times it seems that significant local changes are made to innovations while at other times innovations can be delivered almost 'in tact' to classrooms. While Loucks (1983) has shown some methodological inconsistencies in a number of implementation studies it does seem that there has possibly been a growth in understanding concerning the use of effective innovation strategies.

The main point to note for the purpose of this paper is that these studies have been confined to elementary and secondary schools. How do vocational educators react to the implementation of innovation and how effective are the implementation strategies that are used? The answer to these questions has both policy and resource implications since demands for change and innovation are very much part of vocational education. Unless it is known whether these demands are being met, there can be no guarantee that new ideas and products are influencing teachers and students.

THE STUDY

Studies of curriculum implementation focus on the post-design activities of individuals and organisations involved in the actual use of an innovation. The emphasis is on understanding the events associated with the installation of educational programmes in institutional settings and gaining some measure of the extent to which those programmes are actually being used.

The literature reviewed in the previous section would suggest the usefulness of multi-methodological approaches for any systematic study of curriculum implementation. Case study methods were used in the present study to allow for the in depth analysis of two particular attempts to implement curriculum innovation in vocational education in Western Australia. These methods were supplemented by the use of a standardised questionnaire. Details related to these methods will be discussed with reference to the specific innovations studied.

THE INNOVATIONS

Two specific curriculum innovations were selected for study: a modular system of apprenticeship training in the Electrical Trades area and a pre-apprenticeship training course in the Plumbing area. The innovations were different in their scope (the modular course was designed to service a three-year apprenticeship in the electrical trades while the pre-apprenticeship course was set up with selected staff on selected sites); the student population (the modular system was directed at students who had secured an apprenticeship while the pre-apprenticeship course was specifically designed for students who had not been able to secure an apprenticeship); the major source of funding (the modular system was largely funded from State finances while the pre-apprenticeship course relied heavily on Federal Government funding); and the design and dissemination process that had been used (the electrical trades modular system was designed by Head Office staff and disseminated to college lecturers while the plumbing pre-apprenticeship course involved the lecturers in course design even though the decision to run the course was made centrally). It was felt that these differences would allow useful comparisons to be made across the two areas.

PROCEDURES

A. The Modular System in the Electrical Trades Area

Unstructured interviews were conducted with the Electrical Trades staff of a single college site. The purpose of these interviews was to allow the interviewees to provide as much information as possible about their perceptions of the implementation processes that had accompanied the introduction of the modular system into the Electrical Trades Area. At the same time, information was also collected concerning the interviewees' perceptions of the innovation itself.

Information collected from these interviews was then used in two ways. First, it provided a framework in which further interviews were conducted with personnel labelled as 'key informants'. These were people who had been associated with the introduction of the innovation and who were able to provide information about the intended purposes of the innovation as well as the planned processes of implementation.

Second, a Stages of Concern (SOC) questionnaire (Hall, George and Rutherford, 1977) was administered to staff who had been involved in the initial unstructured interviews. The purpose of the questionnaire was to validate the interview responses. At the same time the SOC questionnaire was also administered to Electrical Trades staff at two other college sites. The purpose of including a larger sample of college sites was to improve the generalisability of responses that had been gained from a single college site.

The usefulness of the SOC questionnaire has been demonstrated recently in the Australian context by Marsh (1983). It is a 35-item Likert scale instrument and its purpose is to indicate the concerns of innovation users as they progress with the implementation of an innovation. The SOC is based on the assumption that user concerns are developmental in nature and move from an exclusive emphasis on 'self' to concerns about the 'task' and eventually to concerns about the 'impact' of the innovation on students. These concerns have been described on a scale from O to 6 as shown in Figure 1

Insert Figure 1 about here

B. Plumbing Pre-Apprenticeship Course

A structured interview schedule based on the results of interviews that had been conducted with Electrical Trades staff was developed. This allowed for some comparison of interview responses to be made. The schedule was used with selected staff involved in the course (across three college sites). At the same time, staff were asked to complete SOC questionnaires. The use of the same instrument which had been used with the Electrical Trades staff again allowed for meaningful comparisons to be made.

RESULTS

A. The Modular System in the Electrical Trades Area

The results of both the unstructured interviews and the administration of the SOC questionnaire are presented in this section.

(i) Interviews

The interviews were concerned with defining the innovation in terms of both its specific components and its implementation context and assessing user response to it.

1. Defining the innovation

The context of the innovation:

The impetus for curriculum change in the Electrical Trades area came from at least four main sources:

a) A job analysis survey of the area conducted in 1977.

b) A newly devised Technical Education Division policy which required the conversion of existing syllabus documents from topic statements to specific performance objectives.

c) The attempts to establish reciprocity of licensing requirements for electricians across Australia..

d) A projected shortage of electricians for the North West Shelf Project.

Each of these elements influenced the final form that the innovation took. The job analysis survey indicated the need for a greater emphasis to be placed on practical aspects of apprenticeship training and for a closer relationship to be developed between theory and practice. The pressure from the Technical Education Division was for a specific format for curriculum statements to be followed. A comparison of licensing requirements across Australia had indicated that considerably less time was being devoted to the testing and assessment of apprentices in Western Australia than was the case in other States. The projected shortage of electricians led to the setting up of a Special Trade Training Scheme largely financed by the Commonwealth Government. This scheme was used to trial the development and implementation of a modular training system. Thus in any change to be made to existing electrical trades curricula, these four areas of concern had to be taken into consideration.

As a result of such considerations, the decision was taken to adopt a modular system of training for Electrical Trades apprentices in Western Australia. It is important to understand, therefore, that the changes which took place in the Electrical Trades area over four years were in response to pressures external to the area rather than from a single theoretical perspective on curriculum organisation and delivery. There were theoretical dimensions to the changes but these dimensions did not dictate the form that the actual change took. Thus the modular system as it currently operates in the Electrical Trdes area cannot be defined in terms of a simple model that might be found in a textbook. Rather, account needs to be taken of the specific components of the innovation as it operated in Western Australia from 1981 to the present.

The components of the modular system in the Electrical Trades area:

The components of an innovation are best thought of as the essential features or characteristics of the innovation. At the outset, it is important to note that two different types of components - those that we have called "present" and "future" - emerged from the data. These concepts are not typically found in the curriculum literature yet they appeared frequently in the discussions with the curriculum developers. They have considerable explanatory power when consideration is given to user reaction to the innovation in a later section of this report.

a) Present components of the innovation

Flexibility of design. Modules were designed as self-contained units of instruction. They could be sequenced in a variety of ways depending on the requirements of a particular course.

Specific performance objectives. Content was expressed in terms of specific performance objectives. These indicated the level of student achievement in topics and sub-topics.

Spiralling of topics. As the apprentice moves from stage to stage, topics are dealt with in more detail and with a greater degree of complexity. Initially, topics are introduced at a very simple level but these are built up on in later states. In this way, topics are developed in a spiral manner moving from the simple to the complex and from the concrete to the abstract.

Criterion referenced testing. Criterion referenced testing was used at the end of each module to assess student performance and as a means of promoting student mastery of the topic.

Theory - practice nexus. Practical aspects of the course were emphasised and theory sessions were to be closely linked with practical sessions that would provide immediate demonstration/illustration for the theory.

b) **Future components of the innovation**

Self-paced learning. The introduction of a modular system for the Electrical Trades area was the first step in a move towards self-paced learning. The curriculum changes introduced in 1981, however, were not intended to be self-paced.

Mastery learning. The term 'mastery' appeared in many of the early documents and there was a real expectation that students should be able to demonstrate mastery of topics at the end of each module. Yet it was also realised that in the apprenticeship training the shortage of time was a constraint which made mastery learning a goal for the future rather than the present. Thus, like self-paced learning mastery learning became associated with what the innovation might achieve for the future.

In summary, the modular system may be described as a flexibly designed course of apprenticeship training that has been broken down into self-contained units of instruction. Each unit contained sub-topics that are further broken down into specific performance objectives. Across the three-year apprenticeship, important topics reappear to be treated in greater depth. Student performance is tested at the end of each module by means of a criterion referenced objective test. While self pacing and mastery learning are not features of the present innovation, it has been recognised that the innovation in its present form has the potential to embrace these concepts.

2. **User response to the innovation**

Responses to the specific components of the innovation

Criterion referenced testing. The general area of assessment and testing evoked the most comment from staff. This is perhaps understandable when it is realised that prior to the introduction of the modular system, assessment was based on a single end-of-year examination. With the modular system came an entirely new method of assessment based on regular testing and aimed at assessing specific skills related to the attainment of specific performance objectives. The problem areas included:

- For many lecturers, the end-of-year examination represented the ideal form of assessment. It was one with which they were most familiar and they expressed confidence in it.

- Objective tests with multiple choice answers did not meet the lecturers' expectations as a rigorous method of assessing student attainment. Objective tests were perceived as being easier than more traditional forms of testing. There were reservations that such testing could maintain the standard of tradespeople being produced. Concerns were expressed that standards were dropping. Even though there was little evidence regarding the effectiveness of either method of assessment, there was strong support for the traditional method of an end-of-year examination.

- Many lecturers had experienced an increase in the administrative load associated with the new assessment system. A single examination was replaced by a series of small tests that had to be marked at regular intervals. A number of lecturers felt that no allowance had been made for this increased load, especially since other requirements of the modular system such as more emphasis on practical work also meant an increased work load.

- In the view of some lecturers, students were not getting practice with important written communication skills, as written responses were no longer required and a tick indicated the correct response.

On the other hand, some lecturers suggested improvements that could be made in assessment processes. Several noted that questions on content from preceding modules could be included in later modules and others said that mid-year and end-of-year examinations could be reinstated along with testing at the end of each module. None of these suggestions was adopted by Head Office personnel and the suggestions remained as untested potential solutions to some of the perceived problems of the assessment system.

Spiralling of curriculum content. A number of lecturers expressed varying degrees of concern over the way specific content was spiralled across the three stages of the apprenticeship. At times they felt this resulted in topics not being dealt with in depth and consequently resulted in boredom for the students. Some stated that the most interesting material was in Stage 3 and this was a long time for a student to have to wait before learning important aspects of particular topics.

The issue of lecturer autonomy in deciding what should be taught and when it should be taught was also raised in this context. Some lecturers commented that they liked to go into detail on particular topics - especially those which dealt with subject matter that they felt was particularly important - yet with topics cut down into small segments they felt constrained.

Use of specific performance objectives. The use of specific performance objectives to guide selection of content was generally seen to be an improvement on the previous system which relied on topic statements to be filled out by lecturers. At the same time, however, there was some concern that the specific performance objectives were constraining in the same way as the spiralling of content. It was felt that the students were constantly getting small pieces of information about topics and at no time did they ever get a broader picture. At the same time there did not seem to be the opportunity to synthesise all the information they were getting.

Theory-practice nexus. All lecturers agreed that theory and practice should be closely linked. Many of them, however, referred to the difficulties they perceived were involved in gaining organisational support for the suggestions made in the curriculum documents. In the documents it was seen that the theory/practice component would be in the ratio of two-thirds to one-third. In reality, however, an equal amount of time was often provided for both components since college timetables were constructed along lines that could not always take curriculum philosophy into account. There was meant to be provision for withdrawing students from practical sessions to talk with them briefly but there were no proper facilities for withdrawal of this kind in many colleges. This was particularly the case in the older colleges.

Flexibility of design. There were a small number of positive comments about the ease with which the modules could be re-sequenced and used in courses other than the apprenticeship training.

Self-paced learning. While it was generally agreed by the lecturers that in actual practice the modular system was group-paced rather than self-paced a number of lecturers were unclear as to whether the system was intended to be self-paced or not.

Mastery learning. The problems of promoting mastery when time was limited were commented upon by lecturers. The fact that time was limited was often blamed on the modular system itself. For many lecturers there was a real tension between a desire to produce trades people with the required necessary skills and the shortage of time in which to do so. While the format of the curriculum document suggested that students should be mastering specific skills and understandings, lecturers were very much aware that this was not always occurring in the limited time available.

In general, then, lecturers indicated a number of concerns they had about the specific components of the modular system. There was neither a sense of total opposition to the system nor outright rejection of it. There were, however, very clear professional concerns especially as regards the assessment and evaluation system that had been adopted, and of all the components this one evoked the most discussion and concern.

User response to the process of implementation

Lecturers reported two main concerns in this area:

- A lack of staff development to accompany the introduction of the modular system.
- A lack of resources to assist with its implementation in the colleges.

These will be discussed in turn.

Staff development. There was a widely-held perception among those interviewed that there was little or no staff development to assist individual lecturers with the implementation of the modular system. At the same time there were recollections of end-of-year seminars where issues relating to the modular system were discussed. The overall impression of most lecturers was that it was rushed from the very beginning and consequently there was no time for specific staff development activities.

Resources and equipment. There was unanimous agreement that there were insufficient resources supplied to facilitate the implementation of the modular system. The increased emphasis on practical work called for new equipment and materials which were not always available in each college. In addition, the facilities available in the colleges often did not allow for an easy transition between theory and practice activities as envisaged by the modular system. Thus, important aspects of the innovation did not seem to receive support from the larger organisational resource system. This was taken to be a disadvantage of the modular system itself since it meant that lecturers were in many cases unable to meet the demands of the innovation.

The unstructured interviews thus raised a number of issues that college staff saw as being important. The Stages of Concern Questionnaire (SOC) (Hall, George and Rutherford, 1977) was then administered to those who had provided the interview data as a means of validating the interview responses. It was also administered to Electrical Trades staff on two other sites in order to improve the generalisability of the results.

(ii) Stages of Concern Questionnaire

1. Site 1

Individual and group percentile scores for each dimension of the SOC questionnaire are shown in Table 1. A number of points can be made about these results.

Insert Table 1 about here

There was considerable variability in responses as indicated by the size of the standard deviations from the mean scores for each dimension of the questionnaire. The mean scores alone tend to mask such variability but it is important to keep in mind that the individual lecturers on Site 1 provided a range of responses on each dimension of the questionnaire. This range indicates that when mean scores are taken to represent the dominant high and low stages of concern of the composite group they should be interpreted cautiously.

For the majority of lecturers on Site 1, Personal concerns were considered to be highest. A description of these concerns has been provided by Hall, George and Rutherford (1977):

> *The individual is uncertain about the demands of the innovation, his/her inadequacy to meet those demands, and her/his role with the innovation. This includes analysis of her/his role in relation to the reward structure of the organisation, decision making and consideration of potential conflicts with existing structures and personal commitment. Financial or status implications of the program for self and colleagues may also be reflected.*

Uncertainty about the demands of the innovation was also reflected in the interviews and in particular in connection with the "future" components of the innovation. While self pacing and mastery learning were not intended to be present components of the innovation, they were implicitly suggested in other components such as the use of specific performance objectives and the use of criterion referenced testing. Thus it should not seem surprising that Personal concerns should feature very strongly as lecturers attempted to work out for themselves exactly what was required. During this process they would also be trying to reconcile their personal views with organisational demands for the innovation. The interview data often suggested that there were conflicts between the views of individuals and the views of Head Office personnel. Again, this indicates why Personal concerns registered highly in this sample of lecturers.

Other concerns such as Management, Consequences and Collaboration were considered moderate. Since the stages of concern are seen as developmental in nature, it could be expected that while the current Personal Concerns have current priority, they will eventually be replaced by those concerns that are presently shown as moderate.

In fact, these data do provide some support for the developmental nature of the concerns since Stage 1 concerns were considered low, Stage 2 concerns were considered high, while the remainder were considered moderate.

Another possible interpretation can be made from an examination of the Refocusing concerns. While Personal Concerns remained high for this sample of lecturers, the second highest stage of concern was on Refocusing. Thus, there was no lack of ideas for resolving some of the concerns. This interpretation is supported by the interview data where a number of ideas was suggested for amending the system of criterion referenced testing. It may be that given organisational support these Personal Concerns could have been easily resolved.

2. **Sites 2 and 3**

Individual and mean percentile scores for each dimensions of the SOC questionnaire for all lecturers on Sites 2 and 3 are shown in Tables 2 and 3 respectively. A number of points can be made about these results.

Insert Tables 2 and 3 about here

As with the responses from Site 1, there was considerable variability of responses among lecturers from Sites 2 and 3 as indicated by the uniformly large standard deviations from the means scores on all dimensions of the SOC questionnaire. Thus, caution needs to be exercised when mean scores are taken to represent the dominant high and low Stages of Concern of the composite group.

The highest stage of concern for lecturers on Site 2 was Refocusing while for those on Site 3 it was Collaboration. Yet for lecturers on both sites the second highest stage of concern was Personal which was the concern nominated by lecturers on Site 1 as their highest stage of concern. Across all sites, Personal concerns were the highest stage of concern for 36.4% of lecturers and it represented the second highest stage of concern for 18.2% of lecturers.

In the ranking of concerns there seemed to be a general agreement across sites although it was not perfect as indicated in Table 4:

Insert Table 4 about here

The rank order correlations range from .62 to .83 and these suggested that lecturers on Sites 2 and 3 may well share the specific views of lecturers on Site 1 concerning the modular system. The generally high level of Personal concerns shared by the lecturers across sites suggest that the demands of the innovation have not been well specified. At the same time, the level of Refocusing concerns suggests that there were plenty of ideas about possible changes that could be made. These concerns are also supported by the interview data from Site 1. While the Personal Concerns may not be as intense on Sites 2 and 3, they certainly present a dominant picture across sites.

B. THE PLUMBING PRE-APPRENTICESHIP COURSE

(i) Inverviews

Results from both the structured interview and the administration of the SOC questionnaire are presented in this section.

1. Defining the Innovation

The context of the innovation:

The context in which the plumbing pre-apprenticeship courses was developed has been described by Juracich and Brand (1984). They identified the following ten problems as adversely affecting the original plumbing pre-apprenticeship course which had been set up in 1972.

a) Reduced work content caused by the poor economic climate and by technological change which caused new materials/joints/methods, new plumbing codes and changes to regulations.

b) Price cutting which tended to benefit the community but adversely affected the plumbing industry.

c) Poor workmanship - resulting in poor public image.

d) Specialisation within industry resulted in employers being unable to provide industry-wide training.

e) New products and information on 'Do It Yourself Plumbing' resulted in less work for qualified plumbers.

f) Breakdown of effective communication between water authorities, inspectors and business operators, especially with regard to inspection for adherence to regulations.

g) The lack of an industry voice in 1980-82 due to few Plumbing Trade Advisory Committee Meetings being held.

h) Responsibility for training moving from the employer to the public sector with all of its concomitant problems.

i) Disillusionment with the pre-apprenticeship programme resulting in the employer organisation demanding modifications.

j) A low priority for the allocation of resources to the plumbing sector in training institutions.

These conditions led the Master Plumbers and Mechanical Services Association to prepare, in December 1981, a submission to the Department of Employment and Training. Two of the recommendations contained in this submission were:

a) to revise the plumbing apprentice 'off-the-job' syllabus;

b) to set up a new pre-apprenticeship course in plumbing on the basis of 20 weeks in a training environment, interspersed with 16 weeks of work experience in industry.

In June 1982, the Plumbing Advisory Committee formed a sub-committee to take these recommendations into account and to review training at both pre-apprenticeship and apprenticeship level. The result was the establishment of a new pre-apprenticeship programme along the following lines:

a) a 40 hour per week education/training programme for 36 weeks;

b) an increase in the number of basic skills to be taught within the pre-apprenticeship course in each case integrating skill and theory;

c) work experience was to be an integral component;

d) there was to be a reduction in the terms of indenture from four to three years;

e) resources in colleges were to be upgraded to match those reequired by the new syllabuses.

The task of translating these guidelines into curriculum was not an easy one, as Juracich and Brand (1984) commented:

> *It was in [an] atmosphere of doubt and concern that the new pre-apprenticeship began to develop. A tremendous amount of time and energy was spent persuading opponents to give the course a chance by reserving their opposition and by assisting to overcome some of the obvious problems.*

<u>The components of the Plumbing pre-apprenticeship course</u>:

<u>Theory-practices nexus</u>. The pre-apprenticeship course had to demonstrate a close relationship between theory and practice. The course was modularised with each module being based on tasks performed by tradespeople. The modules were reinforced by site-simulated work that was able to be completed on-site at each college.

Co-operation between industry and education representatives. A management committee consisting of representatives from employers, unions and the training authority was established. It had responsibility for placing students on work experience, facilitating parent/child evenings and evaluating the programme.

Broad-based on-the-job industry experience. During the course of training, students were placed with employers who were able to provide on site training commensurate with the level of off-site training in school. In this way students gained experience from a realistic work environment and were able to compare environments by being placed with different employers on different occasions.

Ongoing course evaluation. Progressive evaluation of the course was seen to be important to ensure that the needs of all parties involved - students, employers, parents and teachers - were being met. Evaluation included both student assessment as well as general course evaluation.

2. User response to the innovation

Structured interviews were conducted with a number of staff from each of the three college sites involved with the innovation. They provided information about user responses to the specific components of the innovation as well as to the process of implementation itself. Each set of responses will be discussed in turn.

Responses to the specific components of the innovation

Theory-practice nexus. This component of the innovation was the most discussed by all staff interviewed. For the majority of staff, it represented the most significant aspect of the innovation. It was recognised that modularisation and site-simulated work were essential features of this component. All staff agreed with the emphasis on the practical component of the pre-apprenticeship and that it was successful in producing students with basic plumbing skills. Some reservations were expressed concerning the relative advantages for students of doing a course such as this, that is, dedicated to a single trade rather than a course that concentrated on a family of trades. Yet even when such a reservation was expressed it was in the context of explaining the perceived success of the practical emphasis in the present course.

Co-operation between industry and educational representatives. This component was not commented upon at great length by any of the users. Most comments referred to the general usefulness of having good relationships with industry and the unique role played by the Management Committee in the present project. The sample of users interviewed did not perceive that the Committee had a great deal of impact on their day-to-day teaching but rather had an impact with employers and the training institutions.

Broad based on-the-job industry experience. The work experience component of the innovation was seen to be an important element and, because lecturers were involved in student supervision while the students were on work experience, the lecturers were able to assess its usefulness. Some problems had emerged which related to employers who were unable to provide students with a range of activities during the work experience period. In particular, there was the problem of students being allocated heavy manual jobs for the entire work experience period. It was felt that these problems could be solved with a minimum of effort as experience would indicate the best employers with whom to place students.

Progressive ongoing evaluation. For all lecturers, this was an entirely new way of running a course. They were involved in sessions where student feedback on the course was given and in which their own reactions were also sought. In addition, evaluation days had been held for all staff participating in the course. Reactions to these processes were mixed and while some saw value in them they also were critical of the amount of time being devoted to evaluation.

Some felt such time could often have been better used if it had been more closely related to students' needs. Other lecturers, however, could see little value in the evaluation sessions at all.

User response to the process of implementation

Three main problems were perceived relating to the implementation process:

a) Lack of lead time before the innovation was introduced. If more lead time had been provided it would have meant that there was no rush to develop materials (which has to take place in the first stages of course implementation).

b) Lack of resources to accompany the innovation. This problem was felt more acutely by those colleges that were not set up for site-simulated work. This was an initial problem and at the time of interview it seems to have been generally resolved on all sites.

c) Lack of staff development. There was a strong feeling on the part of most lecturers that there had been no real staff development to accompany the introduction of the innovation. Even though lecturers had been especially selected to be involved in the course, a number felt that some initial training would have been useful.

An important aspect of the implementation process was the extent of lecturer involvement in the process of developing the instructional modules. This occurred as the course was being implemented. As the modules were taught they were revised and refined. Evaluation sessions were conducted to obtain input from all lecturing staff. Essentially, teams of staff on each site were responsible for developing the modules. While it does not seem that this was designed as a staff development exercise, it has nevertheless served that purpose.

In summary, it seems that the Plumbing pre-apprenticeship course has been well accepted by the lecturers involved and has engendered a considerable degree of support.

While there are some reservations about the role progressive evaluation should play, this was not the case with the other components of the course. These latter components are all accepted as important and there was a high degree of commitment to them. Even though some deficiencies were highlighted in the process of implementation, these were not perceived to be significant barriers to successful implementation. At the same time, the role of lecturers in preparing modules of instruction has played an important, if unintended, staff development function.

(ii) Stages of Concern Questionnaire: All Sites

The SOC questionnaire (Hall, George and Rutherford, 1977) was administered to all staff who had been involved in the interviews on each college site. Individual group percentile scores for each dimension of the SOC questionnaire are shown in Table 5. A number of points can be made about these results.

Insert Table 5 about here

There was considerable variability in responses as indicated by the size of the standard deviations from the mean scores. This is the case for each site as well as for the sample as a whole. Since the following discussion will be based on mean scores some caution must be exercised since they tend to mask the variability both between sites and within sites.

The highest stage of concern for lecturers on Sites 2 and 3 was with Consequences, i.e. the impact of the innovation on students. For the same lecturers, the second highest stage of concern was with Collaboration. For lecturers on Site 1, however, their highest stage of concern was Refocusing of the Innovation with the second highest stage of concern being Consequences. Across sites, Consequences represented the highest stage of concern for three lecturers while for one other lecturer it represented the second highest stage of concern.

Taken together, these results indicated that concerns about the consequences of the innovation for students were considered to be highest. A description of these concerns is provided by Hall, George and Rutherford (1977):

> *Attention focuses on the impact of the innovation on students in their immediate sphere of influence. The focus is on the relevance of the innovation for students, evaluation of student outcomes, including performance and competencies, and changes needed to increase student outcomes.*

Since the purpose of this innovation is to equip students with basic plumbing skills which will allow them to contribute in a real working environment this concern is understandable. Indeed, it is possible to view the innovation as one that concentrates on developing practical skills almost to the exclusion of theory. Thus, student performance is constantly being measured, whether through the modules or site-simulated work. In a real sense, the innovation is student oriented so that lecturer concerns would seem to be addressing a crucial aspect of the innovation's operation.

The second highest concern is in the area of collaboration. Hall, George and Rutherford (1977) noted:

> *The focus is on co-ordination and co-operation with others regarding use of the innovation.*

Considering the use of teams on each site and the extensive use made of evaluation, these concerns can be understood. This is especially the case if there exists some doubt as to the usefulness of the group processes that are currently being used.

Other concerns can be interpreted in the context of the first and second highest concerns described above. Stage 0 (AWARENESS) concerns were low to medium indicating that all lecturers interviewed were currently using the innovation and were familiar with it. Low scores for Stages 1 (INFORMATIONAL), 2 (PERSONAL) and 3 (MANAGEMENT) are consistent with the hypothesised developmental nature of concerns since the highest concerns came at Stage 4 (CONSEQUENCES). These results indicate that the majority of lecturers had resolved any problems about the personal demands of the innovation and had satisfactorily worked out ways to manage it on a day-to-day basis. Thus, their attention was able to be focused on the needs of students and in working out ways in which the innovation could have the most effective impact on students. Alongside these were Stage 5 (COLLABORATION) concerns, and this would seem to reflect the organisational arrangements of the project that highlighted group processes and decision making. In the interviews, a number of lecturers had indicated some uneasiness about the evaluation component of the course that relied heavily on these processes. Thus, it seems that there was a recognition on the part of lecturers that collaboration and co-ordination were important aspects of the innovation and that attempts should be made to ensure that they worked effectively.

The lack of Stage 6 (REFOCUSING) concerns indicated that the majority of lecturers were not yet at the stage of reformulating the current innovation. They were still concerned about ensuring that the innovation in its present form was working for the benefit of students.

A final point to note in relation to this innovation is that while this interpretation of the results applies to the majority of these lecturers involved, it does not apply to all. For one lecturer, Stage 3 (MANAGEMENT) concerns were highest and for another Stage 6 (REFOCUSING) concerns were highest. These results support the point made by Hall, George and Rutherford (1977) that individuals are likely to proceed through the stages of concern at varying rates and thus any remedial action in the form of providing staff development must take individual rather than mean scores into consideration.

COMPARING THE RESULT OF IMPLEMENTING INNOVATION IN THE ELECTRICAL AND PLUMBING AREA

One way to obtain a direct comparison of the results from the implementation of innovation in the two areas was to compare the results obtained from lecturer responses to the SOC questionnaire. Mean percentile scores were derived by averaging individual responses from all sites and treating the result as the mean score for the innovation. Table 6 shows a comparison of the frequency of highest and second highest stages of concern for the two innovations. A number of points can be made about these results.

Insert Table 6
about here

The highest mean score for the innovation in the Electrical area was for Stage 6 (REFOCUSING) concerns with the second highest mean score being for Stage 2 (PERSONAL) concerns. This compares with the highest mean score in the Plumbing area for Stage 4 (CONSEQUENCES) and the second highest mean score for Stage 5 (COLLABORATION) concerns. In developmental terms then, it would seem that lecturers in the Plumbing area had resolved many of the problems that still confront those in the Electrical area. Whereas the latter were still concerned about the demands of the innovation, the former are now able to concentrate on making changes to the innovation that would improve its impact on students.

This interpretation would seem to be supported by the results shown in Table 6, where 36.4% of the total sample of lecturers in the Electrical area indicated that Stage 2 (PERSONAL) concerns were the highest while a further 27.3% indicated that Stage 6 (REFOCUSING) concerns were highest. These concerns were reinforced with 18.2% of the sample indicating that Stage 2 (PERSONAL) concerns represented their second highest concerns.

In the Plumbing area, 60% of the sample indicated that their highest stage of concern was Stage 4 (CONSEQUENCES) and 80% indicated that their second highest stage of concern was Stage 5 (COLLABORATION).

Why have the innovations in the two areas produced different concerns for the lecturers involved? Since, developmentally, the lecturers in the Plumbing area seem to have overcome many of their problems relating to the nature of the innovation, it would be of some interest to know how this was achieved and why it had not been achieved in the Electrical area. These and other issues will be taken up in the final section of this paper which will explore the implications of the results of this study for understanding the process of curriculum implementation in vocational education.

DISCUSSION AND CONCLUSIONS

Since the present study was concerned with the implementation of two specific innovations in two study areas in vocational education in Western Australia it would be inappropriate to make unrealistic claims concerning the generalisability of the results. Yet important lessons can be learnt from studying discrete innovations especially where attention has been paid to the context in which the innovations especially where attention has been paid to the context in which the innovations have operated. This section of the report, therefore, will highlight those aspects of the present study that have the potential to provide important information about implementation processes in vocational education.

1. Explaining the outcomes of different approaches to implementation

An important finding of this study was related to the results obtained from using the stages of concern (SOC) questionnaire (Hall, George and Rutherford, 1977) to assess user concerns about the innovations in the two study areas. For lecturers in the Electrical area, concerns focused predominantly on the demands of the innovation on individuals and on changing the innovation, whereas for lecturers in the Plumbing area concerns were focused on increasing the impact of the innovation on students and finding effective ways to work as a group. In terms of the developmental rationale behind the SOC questionnaire, these results indicated that the Plumbing staff had overcome many of the problems that still worried staff in the Electrical area and because of this the Plumbing staff were now able to concentrate on the needs of their students rather than on their own needs. An explanation of these results should assist in clarifying and understanding implementation processes in vocational education.

Fullan and Pomfret (1977) have suggested the following four sets of factors that might be considered as the major determinants of successful implementation. An examination of these factors in relation to the two innovations in the present study may suggest why, for one of the innovations, users did not move beyond concerns focused on their own needs, while for the other innovation, users were able to focus their attention on the needs of students.

The two innovations in the present study can be discussed in terms of the following factors.

A. CHARACTERISTICS OF THE INNOVATION
   1. Explicitness (what, who how)
   2. Complexity

B. STRATEGIES
   1. Inservice training
   2. Resource support
   3. Feedback mechanisms
   4. Participation

C. CHARACTERISTICS OF THE ADOPTING UNIT
1. Adoption process
2. Organisational climate
3. Environmental support
4. Political complexity

D. CHARACTERISTICS OF THE MACRO-SOCIOPOLITICAL UNITS

Characteristics of the innovations

It was clear that the Plumbing pre-apprenticeship course was much more clearly defined, that is, explicit, in the minds of users than was the Electrical apprenticeship course. This was highlighted by the need to include "future" components when describing the essential features of the innovation in the Electrical area. For many users in the Electrical area it was unclear as to whether "self-pacing" and "mastery learning" were really meant to be features of the innovation. Such confusion can lead to frustration for users as they attempt to define for themselves what the innovation is and what its demands are for them. A further problem had to do with the perceptions of the innovation held by designers and users. The former had very clear ideas about the main features of the innovation and they were unaware of the problems of users. The issue, therefore, becomes one of differing perceptions regarding the innovation and it would seem to be an important one to overcome.

The question of degree of complexity of the innovations is not quite as difficult to resolve as is the issue of explicitness. The Plumbing pre-apprenticeship course was more complex than the modular system in the Electrical area. The latter was basically an instructional innovaton that did not drastically alter the apprenticeship training system. The Plumbing course was an attempt to provide a greater proportion of "front-end" training, which was intended to influence the existing mode of apprenticeship education. Yet complexity may go further than the actual components of the innovation.

It may be, as Rogers and Shoemaker (1971) have suggested, that degree of complexity is measured by the perceived complexities of the innovation in the minds of the users. If this is the case, then the innovation in the Electrical area would be ranked as more complex than the one in the Plumbing area. The interviews indicated that users saw considerable problems with such issues as student evaluation and successfully integrating theory and practice, and these were features of the innovation what required new skills and new practices for users. It does not seem that such problems arose in the Plumbing area, or if they did they had been overcome by the time of the study. As Fullan and Pomfret (1977) point out, however, there is probably some relationship between complexity and explicitness so that those innovations that are explicit should not create significant problems for users.

Strategies

Specific inservice training was not a feature associated with either innovation, at least in the minds of the users. In addition, both groups of staff felt that more resource support could have been provided, although comments from the Electrical area were much stronger on this point. Limited attempts at providing feedback mechanisms had been provided in the Electrical area while in the Plumbing area such mechanisms

were built into the innovation through evaluation sessions. Participation was a key feature of the innovation in the Plumbing area where users actually designed, implemented and evaluated the training modules and were involved in general course evaluation. In the Electrical area, users were involved only as implementers.

Characteristics of the adopting unit

In the Electrical area, users adopted the modular system of training for apprentices because the decision had been made by a central authority that such would be the case. In the Plumbing area, users were especially selected to be involved and it seems that selection was on the basis of their potential to meet the objectives of the new course. Little is known about the effects of such involvement on subsequent implementation but even the operation of a "Hawthorne effect" might influence those users who had been chosen. These conditions, however, may well affect the organisational climate of the adopting units. It could be hypothesised that the climate of sites that had been especially selected would be more favourable to implementation than that of sites which had the adoption decision forced upon them from a central authority. This might especially be the case where additional funds accompanied the innovation as in the Plumbing area.

The two innovations were implemented by different staff on different sites with different student populations. Fullan and Pomfret (1977) have suggested that factors such as social class, urban differences, role expectations for different students and teacher capacity to implement may have an important part to play in successful implementation. Suffice to say that, in terms of the present study, these factors may have influenced outcomes in a manner that has yet to be understood.

Characteristics of macro-sociopolitical units

The political context of innovation is always an important factor to take into consideration. The innovation in the Plumbing area had a much larger political constituency than did that in the Electrical area. The former was involved with Federal Government initiatives in apprenticeship training, employer groups and a State Government department. The latter was largely a local initiative, although a number of external influences operated in stimulating the change effort. The complexity of the political context and its influence on subsequent implementation is difficult to untangle, yet it is important to be aware of it. For example, in the Electrical area, final reporting was done to the local authority responsible for making the initial adoption decision; whereas, in the Plumbing area, reporting was done to a much more broadly based group some of whom may well play an important role in implementation. It is uncertain at this stage exactly what that role is or how it influences implementation.

Two main points can be made as a result of the above analysis. First, the processes of implementation are so complex that at present it is impossible to attribute cause and effect. Second, any attempt to explain these processes must be considered as a preliminary interpretation, subject to further empirical study. Within these constraints, the following comments can be made.

The three factors that emerge as being particularly significant in the present study have to do with explicitness of the innovation, feedback mechanisms and participation. The innovation in the Plumbing area could be rated very high on these factors while that in the Electrical area rated low. Thus a tentative interpretation of the results might indicate that if users are to move from their own personal concerns about the innovation to be concerned with the personal concerns with the impact of the innovation on students, then implementation processes have to ensure that the main features of the innovation are well specified, mechanisms are provided for feedback to all participants including administrators, lecturers, students and parents, and provision is made for active and meaningful user participation in decision making, either at the adoption stage or during initial implementation. These processes have been identified as being important by Fullan and Pomfret (1977) as a result of their review of the literature. The present study highlights them because they represent a clear demarcation between the two innovations studies and hence point to a possible explanation for the advanced SOC developmental stage reached by users in the Plumbing area.

The point should be stressed again that this interpretation is tentative only and needs to be subjected to further empirical testing. As Berman (1981) has commented, there has been a tendency in studies of educational change to confuse variance studies with process studies. Whereas the latter are able to provide insights into the processes associated with change and describe events that seem to be linked with successful implementation, the former attempt to account for variation in a dependent variable by planned variation in one or more independent variables. The present study was clearly an analysis of processes rather than an analysis of variation, and the results would be treated accordingly. Nevertheless, an important advance in our understanding of implementation will have been made if further studies can confirm that successful implementation, characterised by a concern for the impact of the innovation of students, is related to the following factors:

- Explicitness of the innovation in the mind of the users;
- The provision of feedback mechanisms for all participants involved in the implementation process;
- Active user participation in decision making.

The present study clearly suggests that much could be gained from further studies along these lines.

2. **The role of the user in vocational education**

This study clearly indicated that, in terms of implementation processes, users in vocational education have much in common with their colleagues in the compulsory education sectors. Like elementary and secondary teachers, the vocational education lecturers in the present study have well-defined views about the nature and purpose of training and education and their views influence decisions about implementation. Vocational education lecturers cannot be treated as passive receptors of ideas, practices and innovations: they critically assess whatever is brought before them and will suggest or make changes where they think this is important. While they are very much aware of their role in serving the needs of industry they are also aware of their own professional competence as tradespeople and educators.

Many studies of curriculum implementation based on elementary and secondary schools have indicated the strong role played by users as the mediators of innovation. This was also the case for vocational education lecturers in the present study. When they were critical of innovation it was usually for the reason that, in their view, improvements could be made to either the implementation process or to the actual product being implemented. It seems important to understand that individual lecturers have a very strong sense of what is best for their students and are not content to settle for anything less. The vocational education lecturers in this study revealed that they were highly professional, highly motivated decision makers who had the ability to adapt and modify innovations to suit the needs of their students and their particular environments. Assessing the extent of modification was not an aspect of the present study but there seems little doubt that vocational education teachers will modify innovations in what they see to be the interests of their students.

3. **Providing staff development to assist curriculum implementation**

All lecturers in the present study were agreed that very little had been done in the way of providing specific staff development experiences for staff involved in implementing the innovations. In the Electrical area, the views of lecturers were at odds with the views of course designers, who were as adamant that such experiences had been provided. Nevertheless, user perceptions at least indicate that the impact of any staff development was minimal.

Given either the lack of effectiveness or complete lack of staff development, a surprising result of the study was the relative unimportance attached to Stage 1 (INFORMATIONAL) concerns. Lecturers did not appear to want any further information about the innovation even though this had not been specifically provided through staff development. This raises the question, then, of what should be considered as appropriate staff development to accompany curriculum implementation given that information about the innovations can be disseminated through other channels.

Fullan and Pomfret (1977) have pointed out that intensive staff development as distinct from single workshops or pre-service training can be an important strategy to assist implementation. The aim of such a program would be the complete resocialisation of the user until he/she felt comfortable with the demands of the innovation. The program should take place not only prior to implementation but during early implementation as well, and should provide users with demonstration models and experiences as well as psychological reinforcement. Thus, staff development should be neither isolated nor shortlived; rather, it should be seen as an ongoing activity that is a crucial factor in bringing about successful implementation.

A final point has to do with the provision of staff development not only for initial users of the innovation but also for users who come to it after a first round of implementation. It seemed to be the case, in the Electrical area in particular, that most effort went into initial implementation but little time seemed to be devoted to inducting new lecturers into the course.

This may well be as much a task of pre-service training as in-service staff development yet it is one that clearly needs attention. Staff development should be included as a training device for all users during both initial and subsequent implementation.

4. Relationship between curriculum design and curriculum implementation

It was pointed out earlier in this paper that vocational education systems in Australia have relied on the efficacy of systematic curriculum design models to produce usable curricula. It seems clear from the results of this study that such models do little more than produce curriculum documents that must then be interpreted by users. A realistic approach to curriculum design will therefore take into consideration possible user reactions and attempt to cater for them. This can be most easily done where the users are also the designers (as in the case of the instructional modules for the Plumbing pre-apprenticeship course) but can also be attempted by a central design team preparing materials for dissemination. It involves viewing curriculum development as an holistic process involving both design and implementation. The lesson learnt from curriculum implementation must inform the design process otherwise design takes place in a vacuum and barriers to successful implementation can be created from the beginning.

5. Curriculum decision making and implemention

The two innovations in the present study provided examples of different decision making structures and highlighted the importance of initial implementation. For both innovations, decisions to proceed with the development task were made centrally and without reference to potential users. In the Electrical area, the design phase then proceeded and products were disseminated for use in local colleges. In the Plumbing area, the design and evaluation of the instructional system were placed in the hands of the users who then became decision makers in regard to course construction. The success of the Plumbing course would seem to suggest that major policy decisions can be made centrally if users can become active decision makers during initial implementation. It does not seem to be a matter

of handing over all decision making to local groups. Rather, it is a matter of providing decision making opportunities that will involve users in developing a sense of ownership over the curriculum documents. It is a complex process that requires real power to be placed in the hands of users.

6. Classroom level implementation

This study has not sought to report on classroom level implementation yet it recognises that much can be learnt from close observation of the operational curriculum. The emphasis in the present study has been on the perceptions and concerns of users about implementation processes. These perceptions and concerns are important to understand, since at present very little is known about them and it can be hypothesised that they, in fact, determine the form that curriculum will take. An appropriate follow-up study would be one that sought to trace the relationship between concerns and classroom practice.

7. Implications of the present study for policy makers

Policy makers are often faced with the harsh realities of allocating limited resources in the context of unlimited demand. Unfortunately this study will make the task harder rather than easier. The study has indicated the importance of paying close attention to the implementation phase of curriculum development. This cannot be done without allocating resources to ensure that adequate equipment is available to accompany the introduction of new courses, that ongoing staff development is a feature of both pre-implementation and initial implementation phases of projects, and that adequate time is made available for staff to become involved in meaningful activities related to the innovation. At the same time, renewed attention must be paid to the curriculum design process to ensure that it takes implementation realities into consideration. Thus, it is not simply a matter of transferring resources from the "front-end" of curriculum development to later stages; it is a matter of attending to curriculum development as an holistic process and appreciating it as an interactive activity.

In the vocational education context, the end result of well-developed vocational curricula is a skilled tradesperson or technician who can contribute to society both socially and economically. Thus, if methods can be found to improve curriculum processes they should be supported in the interests of both individuals and society as a whole. The present study has suggested a number of directions that could be followed to bring about curriculum improvement and, it is hoped, laid the groundwork for future studies. As Fullan and Pomfret (1977) have pointed out:

> *A great deal of work remains to be done on conceptualizing the meaning and processes of implementation, on gathering and analysing data on different aspects of the process, on assessing the consequences of different strategies, and on deriving specific policy recommendations at all levels of the political and educational system.*

Figure 1: HYPOTHESISED STAGES OF CONCERN (SOC) FOR INNOVATION USERS

6 REFOCUSING

The focus is on exploration of more universal benefits from the innovation, including the possibility of major changes.

5 COLLABORATION

The focus is on co-ordination and co-operation with others regarding the innovation.

4 CONSEQUENCE
Attention is focused on the impact of the innovation on students.

3 MANAGEMENT

Attention is focused on the processes and tasks of using the innovation.

2 PERSONAL

Individual is uncertain about the demands of the innovation.

1 INFORMATIONAL

A general awareness of the innovation.

0 AWARENESS

Little concern about involvement.

From Marsh (1983) and based on Hall, George and Rutherford (1977).

TABLE 1

STAGE OF CONCERN PERCENTILE SCORES FOR SITE 1 (n=9)
(ELECTRICAL)

Subject Number	Stages of Concern 0	1	2	3	4	5	6
	Individual Percentile Scores						
1	29	51	96	85	86	93	99
2	37	43	70	88	54	44	94
3	46	80	80	39	82	95	52
4	53	90	92	52	96	36	84
5	60	45	35	27	66	55	42
6	46	45	87	60	33	64	20
7	23	48	70	73	59	91	99
8	53	72	85	88	63	80	84
9	10	90	96	56	66	76	87
	Group profile (n=9)						
X	39.7	62.7	79.0	63.1	67.2	70.4	73.4
SD	16.3	20.1	19.2	22.0	18.8	21.9	28.4

TABLE 2

STAGE OF CONCERN PERCENTILE SCORES FOR SITE 2 (n=5)
(ELECTRICAL)

Subject Number	Stages of Concern 0	1	2	3	4	5	6
			Individual Percentile Scores				
1	46	63	72	60	38	36	34
2	46	48	89	80	59	59	81
3	10	5	21	34	30	68	69
4	10	16	48	34	19	55	95
5	46	69	91	99	59	80	97
			Group profile (n=5)				
X	31.6	40.2	64.2	61.4	41.0	59.6	75.0
SD	19.7	28.4	29.7	28.6	17.8	16.3	25.5

TABLE 3

STAGE OF CONCERN PERCENTILE SCORES FOR SITE 3 (n=8)
(ELECTRICAL)

Subject Number	Stages of Concern 0	1	2	3	4	5	6
			Individual Percentile Scores				
1	23	43	67	27	59	52	69
2	60	45	5	7	38	10	22
3	66	48	85	80	54	98	81
4	10	40	96	60	27	88	57
5	53	45	52	73	92	88	97
6	46	45	91	88	27	68	47
7	10	40	63	60	90	98	92
8	60	72	89	73	82	76	69
			Group profile (n=8)				
X	41.0	47.3	68.5	58.5	58.6	72.8	66.8
SD	23.2	10.4	29.7	27.8	27.0	29.6	24.7

TABLE 4

RANK ORDER CORRELATION OF MEAN PERCENTILE SCORES ACROSS SITES

Site	1	2	3
1		.77	.83
2			.62

TABLE 5

STAGE OF CONCERN PERCENTILE SCORES (PLUMBING)

Site	Stages of Concern						
	0	1	2	3	4	5	6
				Individual Percentile Scores			
1 (n=2)	10	19	17	2	19	44	38
	37	43	21	56	43	5	38
				Group Profile			
X	**23.5**	**31.0**	**19.0**	**29.0**	**31.0**	**24.5**	**49.0**
SD	**19.1**	**17.0**	**2.8**	**38.2**	**17.0**	**27.6**	**15.6**
				Individual Percentile Scores			
2 (n=2)	10	34	52	39	82	84	69
	53	19	14	18	82	72	38
				Group Profile			
X	31.5	26.5	33.0	28.5	82.0	78.0	53.5
SD	30.4	10.6	26.9	14.9	0.0	8.5	21.9
				Individual Percentile Scores			
3 (n=1)	29	72	63	80	90	84	52

TABLE 6

COMPARING HIGHEST AND SECOND HIGHEST STAGES OF CONCERN FOR INNOVATIONS IN THE ELECTRICAL AND PLUMBING AREAS

	STAGES OF CONCERN			
	Highest	n	Second highest	n
Electrical (n=22)	Refocusing	6	Personal	8
Plumbing (n=5)	Consequences	3	Collaborative	4

REFERENCES

BERMAN, P. (1981) Education change - An implementation paradigm. In R. Lehming and H. Kane (Eds.), *Improving Schools: Using what we know*. Beverley Hills: Sage Publications.

BERMAN, P. & McLAUGHLIN, M. (1978) *Federal programs supporting educational change. Vol.8: Implementing and sustaining innovations*. Santa Monica, CA: Rand Corporation.

BRIGSS, L. (1970) *Handbook of procedures for the design of instruction*. Pittsburg, Pennsylvania: American Institute for Research.

CHARTERS, W. & JONES, J. (1973) On the risk of appraising non-events in program evaluation. *Educational Researcher*, 2, (11), 5-7.

CRANDALL, D. (1983) Emulation and replication as a scenario for successful school improvement. Paper presented at the annual meeting of the American Educational Research Association, Montreal.

DATTA, L. (1980) Changing times: the study of federal programs supporting educational change and the case for local problem solving. *Teachers College Record*, 82, (1), 101-116.

DICK, W. & CAREY, L. (1978) *The systematic design of instruction*. Glenview Illinois: Scott, Foreman and Company.

EVANS, W. & SHEFFLER, J. (1976) Assessing the implementation of an innovative instructional system. *Journal of Educational Administration*, XIV, (1), 107-118.

FARRER, E., De SANCTIS, J. & COHEN, D. (1980) Views from below: Implementation research education. *Teachers College Record*, 82(1) 77-100.

FULLAN, M. (1981) The relationship between evaluation and implementation. In A. Levy and D. Nevo (Eds.), *Evaluation rates in education*, New York: Gordon and Breach.

FULLAN, M. & POMFRET, A. (1977) Research on curriculum and instruction implementation. *Review of Educational Research*, 47(1), 335-397.

HALL, G. & LOUCKS, S. (1977) A developmental model for determining whether the treatment is actually implemented. *American Educational Research Journal*, 14(3), 263-276.

HALL, G., GEORGE, A, & RUTHERFORD, W. (1977) *Measuring stages of concern about an innovation: A manual for the use of the SOC questionnaire*. Austin, Texas: University of Texas.

HAVELOCK, R. (1971) The utilisation of educational research and development. *British Journal of Educational Technology*, 2(2), 84-98.

HURST, P. (1988) Implementing educational change - A critical review of the literature. Occasional Paper No. 5, Department of Education in Developing Countries, University of London Institute of Education.

JURACICH, F. & BRAND, B. (1984) *Evaluation report of an innovative approach to apprentice/preapprentice training for the pumbing trade.* Perth: Technical Education Division, Education Department of Western Australia.

KENNEDY, K., WILLIAMSON, J. & PATTERSON, C. (1984) *Curriculum implementation - An annotated bibliography.* 12(3), 86-102.

LARSON, J. & AGARWALA-ROGERS, R. (1977) Reinvention of innovative ideas: Modified? adapted? none of the above? *Evaluation 4*, 136-140.

LEITHWOOD, K. & MONTGOMERY, D. (1980) Evaluating program implementation. *Evaluation Review*, 4(2), 193-214.

LOUCKS, S. (1983) Defining fidelity: a cross-study analysis. Paper presented at the annual meeting of the American Educational Research Association, Montreal.

LOUCKS, S. & LIEBERMAN, A. (1983) Curriculum implementation. In F. English (Ed.) *Fundamental curriculum decisions*, Virginia: Association for Supervision and Curriculum Development.

McLAUGHLIN, M. Implementation research and evaluation desin. Program report No.84-B1. Institute for Research, Educational Finance and Governance, Stanford University.

MALING, J. (1981) The Broderick Report: Its contribution to the process of developing a curriculum theory for the preparation of TAFE courses. In *The processes of curriculum development in TAFE.* AARE Conference Report-Workshop Report.

MARSH, C. (1983) Teachers' use of the Social Educational Materials Project (SEMP). *Australian Journal of Education*, 27(3), 249-259.

RICE, R. & ROGERS, E. (1980) Reinvention in the innovation process. *Knowledge: Creation, Diffusion, Utilization.* 1(4), 499-514.

ROGERS, E. M. (1962) *Diffusion of innovations.* New York: Free Press of Glencoe.

ROGERS, E. & SHOEMAKERS, F. (1971) *Communication of innovations.* New York: Macmillan.